

Claims

1. A method of adhering a first component to a second component comprising the steps of:
- 5 melting a reactive hot melt composition, having a softening point of at least 50°C, and being curable on heating to a temperature of 150°C, the composition comprising a blend of
- (a) a macrocyclic oligomer having a softening point of at least 50°C, containing at least one ring having eight or more atoms, and being able to undergo decyclization at
- 10 temperature of 150°C or more, to produce a polymerizable species, wherein each cyclic oligomer molecule provides two or more structural repeat units of the same or different formula for the resulting polymer, and
- (b) a thermoplastic resin;
- contacting the first and second components with the melted composition to form an
- 15 initial bond between the components; and
- applying heat to cure the composition.
2. A method of adhering a first component to a second component comprising the steps of:
- 20 positioning a sheet of a reactive hot melt composition, having a softening point of at least 50°C, and being curable on heating to a temperature of 150°C between the first and second components to form a sandwich layer, wherein the composition comprised a blend of
- (a) a macrocyclic oligomer having a softening point of at least 50°C, containing at
- 25 least one ring having eight or more atoms, and being able to undergo decyclization at a temperature of 150°C or more, to produce a polymerizable species, wherein each cyclic oligomer molecule provides two or more structural repeat units of the same or different formula for the resulting polymer, and
- (b) a thermoplastic resin;
- 30 melting the sandwich layer to form an initial bond between the components; and

applying heat to cure the composition.

3. A method as claimed in Claim 1 or Claim 2, wherein the thermoplastic resin comprises a polymer capable of reacting with the cyclic oligomer to produce a cross-linked thermoset polymer.

4. A method as claimed in Claim 3 wherein the polymer capable of reacting with the cyclic oligomer is a material capable of cross-esterification.

5. A method as claimed in Claim 4 wherein the polymer capable of reacting with the cyclic oligomer is a polymer containing glycidyl methacrylate groups.

6. A method as claimed in Claim 1 or Claim 2, wherein the thermoplastic resin comprises a random interpolymers of ethylene with at least one additional comonomer.

7. A method as claimed in Claim 6, wherein the comonomer is methylacrylate, methylmethacrylate, ethylacrylate, ethylmethacrylate, butylacrylate, butylmethacrylate, vinyl acetate, maleic anhydride, and/or glycidyl methacrylate.

8. A method as claimed in Claim 6 or Claim 7, wherein the ethylene interpolymers is an ethylene-acrylic acid copolymer, an ethylene-methacrylic acid copolymer, an ethylene-acrylic acid-methacrylic acid terpolymer, an ethylene-vinyl acetate copolymer, an ethylene-methyl acrylate copolymer, an ethylene-ethyl acrylate copolymer, an ethylene-maleic anhydride copolymer, an ethylene-glycidyl methacrylate copolymer, an ethylene-vinyl acetate-maleic anhydride terpolymer or ethylene-ethyl acrylate-glycidyl methacrylate terpolymer.

9. A method as claimed in any one of the preceding Claims, wherein the thermoplastic resin comprises a polyester.

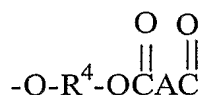
10. A method as claimed in any one of the preceding Claims, wherein the composition additionally comprises a polymerisation catalyst.
11. A method as claimed in Claim 10, wherein the catalyst comprises at least one of a
5 tin compound and or a titanium compound.
12. A method as claimed in Claim 10 or Claim 11, wherein the catalyst is present in an amount from 0.1 to 1 mole percent based on the macrocyclic oligomer.
- 10 13. A method as claimed in any one of the preceding Claims, wherein the macrocyclic oligomer is a macrocyclic polycarbonate, polyester, polyimide, polyetherimide, polyphenylene ether-polycarbonate co-oligomer, polyetherimide-polycarbonate co-oligomer or a blend of two or more thereof, or a method or co-oligomer prepared therefrom.
- 15 14. A method as claimed in Claim 13, wherein the macrocyclic oligomer contains a structural repeat unit corresponding to the formula:
- $$\text{-O-R}^4\text{-OC(=O)C(=O)-}$$
- wherein each R⁴ independently is an alkylene, a cycloalkylene, a monooxyalkylene or a
20 polyoxyalkylene group and each A independently is a divalent aromatic or alicyclic group.
15. A method as claimed in Claim 13, wherein the macrocyclic oligomer contains structural repeat units of one of 1,4-butylene terephthalate, 1,3-propylene terephthalate,
25 1,4-cyclohexylene dimethylene terephthalate, ethylene terephthalate, 1,2-ethylene 2,6-naphthalene dicarboxylate or wherein the macrocyclic co-oligomer comprising two or more of the said structural repeat units.

16. A method as claimed in any one of the preceding Claims, which also comprises a filler, a plasticiser, a polyol, a glycol, soybean oil, tone oil, a mineral oil an epoxy resins or two or more thereof.

5 17. A method as claimed in Claim 1, wherein the composition has a softening point of at least 50°C, and is curable on heating to a temperature of 150°C, the composition comprising a blend of

(a) a macrocyclic oligomer having a softening point of at least 50°C, containing a structural repeat unit corresponding to the formula:

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15 wherein each R⁴ independently is an alkylene, a cycloalkylene, a monooxyalkylene or a polyoxyalkylene group and each A independently is a divalent aromatic or alicyclic group, wherein the oligomer is able to undergo decyclization at a temperature of 150°C or more, to produce a polymerizable species, and

(b) a thermoplastic resin comprising a random interpolymer of ethylene with at least
20 one additional comonomer selected from methylacrylate, methylmethacrylate, ethylacrylate, ethylmethacrylate, butylacrylate, butylmethacrylate, vinyl acetate, maleic anhydride, and/or glycidyl methacrylate.

18. A method as claimed in claim 17, wherein the composition additionally comprises
25 a polyester.

19. A method as claimed in claim 17 or claim 18, wherein the composition additionally comprises a tin or titanium polymerisation catalyst.

30 20. The use as an adhesive of a reactive hot melt composition, having a softening point of at least 50°C, and being curable on heating to a temperature of 150°C, the composition comprising a blend of

(a) a macrocyclic oligomer having a softening point of at least 50°C, containing at

least one ring having eight or more atoms, and being able to undergo decyclization at a temperature of 150°C or more, to produce a polymerizable species, wherein each cyclic oligomer molecule provides two or more structural repeat units of the same or different formula for the resulting polymer, and

- 5 (b) a thermoplastic resin.

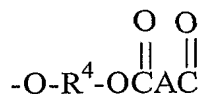
21. A reactive hot melt composition, having a softening point of at least 50°C, and being curable on heating to a temperature of 150°C, the composition comprising a blend of

- 10 (a) a macrocyclic oligomer having a softening point of at least 50°C, containing at least one ring having eight or more atoms, and being able to undergo decyclization at a temperature of 150°C or more, to produce a polymerizable species, wherein each cyclic oligomer molecule provides two or more structural repeat units of the same or different formula for the resulting polymer, and

- 15 (b) a thermoplastic resin

22. A reactive hot melt composition, having a softening point of at least 50°C, and being curable on heating to a temperature of 150°C, the composition comprising a blend of

- 20 (a) a macrocyclic oligomer having a softening point of at least 50°C, containing a structural repeat unit corresponding to the formula:



- wherein each R⁴ independently is an alkylene, a cycloalkylene, a monooxyalkylene or a polyoxyalkylene group and each A independently is a divalent aromatic or alicyclic group, wherein the oligomer is able to undergo decyclization at a temperature of 150°C or
 30 more, to produce a polymerizable species, and
 (b) a thermoplastic resin comprising a random interpolymer of ethylene with at least one additional comonomer selected from methylacrylate, methylmethacrylate,

ethylacrylate, ethylmethacrylate, butylacrylate, butylmethacrylate, vinyl acetate, maleic anhydride, and/or glycidyl methacrylate.

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23. The composition as claimed in claim 22, additionally comprising a polyester.

24. The composition as claimed in claim 22 or claim 23, additionally comprising a tin or titanium polymerisation catalyst.